Research Article

Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults

The Adverse Childhood Experiences (ACE) Study

Vincent J. Felitti, MD, FACP, Robert F. Anda, MD, MS, Dale Nordenberg, MD, David F. Williamson, MS, PhD, Alison M. Spitz, MS, MPH, Valerie Edwards, BA, Mary P. Koss, PhD, James S. Marks, MD, MPH

Background: The relationship of health risk behavior and disease in adulthood to the breadth of exposure to childhood emotional, physical, or sexual abuse, and household dysfunction during childhood has not previously been described.

Methods: A questionnaire about adverse childhood experiences was mailed to 13,494 adults who had completed a standardized medical evaluation at a large HMO; 9,508 (70.5%) responded. Seven categories of adverse childhood experiences were studied: psychological, physical, or sexual abuse; violence against mother; or living with household members who were substance abusers, mentally ill or suicidal, or ever imprisoned. The number of categories of these adverse childhood experiences was then compared to measures of adult risk behavior, health status, and disease. Logistic regression was used to adjust for effects of demographic factors on the association between the cumulative number of categories of childhood exposures (range: 0–7) and risk factors for the leading causes of death in adult life.

Results: More than half of respondents reported at least one, and one-fourth reported ≥2 categories of childhood exposures. We found a graded relationship between the number of categories of childhood exposure and each of the adult health risk behaviors and diseases that were studied ($P < .001$). Persons who had experienced four or more categories of childhood exposure, compared to those who had experienced none, had 4- to 12-fold increased health risks for alcoholism, drug abuse, depression, and suicide attempt; a 2- to 4-fold increase in smoking, poor self-rated health, ≥50 sexual intercourse partners, and sexually transmitted disease; and a 1.4- to 1.6-fold increase in physical inactivity and severe obesity. The number of categories of adverse childhood exposures showed a graded relationship to the presence of adult diseases including ischemic heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease. The seven categories of adverse childhood experiences were strongly interrelated and persons with multiple categories of childhood exposure were likely to have multiple health risk factors later in life.

Conclusions: We found a strong graded relationship between the breadth of exposure to abuse or household dysfunction during childhood and multiple risk factors for several of the leading causes of death in adults.

Medical Subject Headings (MeSH): child abuse, sexual, domestic violence, spouse abuse, children of impaired parents, substance abuse, alcoholism, smoking, obesity, physical activity, depression, suicide, sexual behavior, sexually transmitted diseases, chronic obstructive pulmonary disease, ischemic heart disease. (Am J Prev Med 1998;14:245–258)

Department of Preventive Medicine, Southern California Permanente Medical Group (Kaiser Permanente), (Felitti) San Diego, California 92111. National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, (Anda, Williamson, Spitz, Edwards, Marks) Atlanta, Georgia 30333. Department of Pediatrics, Emory University School Medicine, (Nordenberg) Atlanta, Georgia 30333. Department of Family and Community Medicine, University of Arizona Health Sciences Center, (Koss) Tucson, Arizona 85727.

Address correspondence to: Vincent J. Felitti, MD, Kaiser Permanente, Department of Preventive Medicine, 7060 Clairemont Mesa Boulevard, San Diego, California 92111.

PII S0749-3797(98)00017-8

Introduction

Only recently have medical investigators in primary care settings begun to examine associations between childhood abuse and adult health risk behaviors and disease.[1–5] These associations are important because it is now clear that the leading causes of morbidity and mortality in the United States[6] are related to health behaviors and lifestyle factors; these factors have been called the "actual" causes of death.[7] Insofar as abuse and other potentially damaging childhood experiences contribute to the development of these risk factors, then these childhood exposures should be recognized as the basic causes of morbidity and mortality in adult life.

See related Commentary on pages 354, 356, 361.

Although sociologists and psychologists have published numerous articles about the frequency[8–12] and long-term consequences[13–15] of childhood abuse, understanding their relevance to adult medical problems is rudimentary. Furthermore, medical research in this field has limited relevance to most primary care physicians because it is focused on adolescent health,[16–20] mental health in adults,[20] or on symptoms among patients in specialty clinics.[22,23] Studies of the long-term effects of childhood abuse have usually examined single types of abuse, particularly sexual abuse, and few have assessed the impact of more than one type of abuse.[5,24–28] Conditions such as drug abuse, spousal violence, and criminal activity in the household may co-occur with specific forms of abuse that involve children. Without measuring these household factors as well, long-term influence might be wrongly attributed solely to single types of abuse and the cumulative influence of multiple categories of adverse childhood experiences would not be assessed. To our knowledge, the relationship of adult health risk behaviors, health status, and disease states to childhood abuse and household dysfunction[29–35] has not been described.

We undertook the Adverse Childhood Experiences (ACE) Study in a primary care setting to describe the long-term relationship of childhood experiences to important medical and public health problems. The ACE Study is assessing, retrospectively and prospectively, the long-term impact of abuse and household dysfunction during childhood on the following outcomes in adults: disease risk factors and incidence, quality of life, health care utilization, and mortality. In this initial paper we use baseline data from the study to provide an overview of the prevalence and interrelation of exposures to childhood abuse and household dysfunction. We then describe the relationship between the number of categories of these deleterious childhood exposures and risk factors and those diseases that underlie many of the leading causes of death in adults.[6,7,36,37]

Methods

Study Setting

The ACE Study is based at Kaiser Permanente's San Diego Health Appraisal Clinic. More than 45,000 adults undergo standardized examinations there each year, making this clinic one of the nation's largest free-standing medical evaluation centers. All enrollees in the Kaiser Health Plan in San Diego are advised through sales literature about the services (free for members) at the clinic; after enrollment, members are advised again of its availability through new-member literature. Most members obtain appointments by self-referral; 20% are referred by their health care provider. A recent review of membership and utilization records among Kaiser members in San Diego continuously enrolled between 1992 and 1995 showed that 81% of those 25 years and older had been evaluated in the Health Appraisal Clinic.

Health appraisals include completion of a standardized medical questionnaire that requests demographic and biopsychosocial information, review of organ systems, previous medical diagnoses, and family medical history. A health care provider completes the medical history, performs a physical examination, and reviews the results of laboratory tests with the patient.

Survey Methods

The ACE Study protocol was approved by the Institutional Review Boards of the Southern California Permanente Medical Group (Kaiser Permanente), the Emory University School of Medicine, and the Office of Protection from Research Risks, National Institutes of Health. All 13,494 Kaiser Health Plan members who completed standardized medical evaluations at the Health Appraisal Clinic between August–November of 1995 and January–March of 1996 were eligible to participate in the ACE Study. Those seen at the clinic during December were not included because survey response rates are known to be lower during the holiday period.[38]

In the week after visiting the clinic, and hence having their standardized medical history already completed, members were mailed the ACE Study questionnaire that included questions about childhood abuse and exposure to forms of household dysfunction while growing up. After second mailings of the questionnaire to persons who did not respond to the first mailing, the response rate for the survey was 70.5% (9,508/13,494).

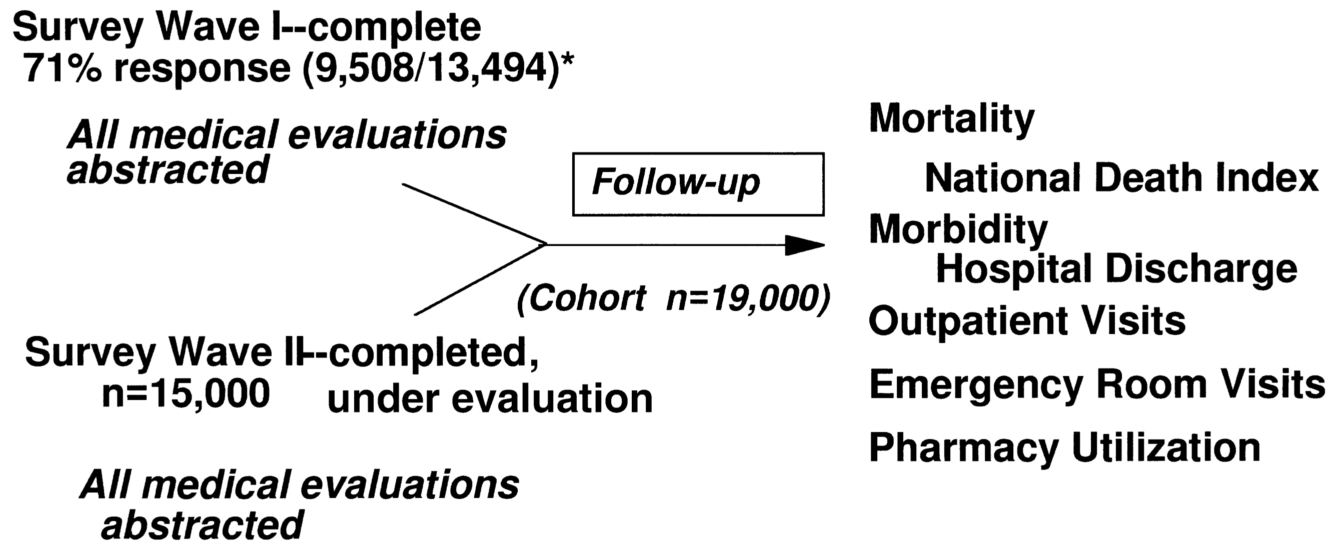


Figure 1. ACE Study design. *After exclusions, 59.7% of the original wave I sample (8,056/13,494) were included in this analysis.

A second survey wave of approximately the same number of patients as the first wave was conducted between June and October of 1997. The data for the second survey wave is currently being compiled for analysis. The methods for the second mail survey wave were identical to the first survey wave as described above. The second wave was done to enhance the precision of future detailed analyses on special topics and to reduce the time necessary to obtain precise statistics on follow-up health events. An overview of the total ACE Study design is provided in Figure 1.

Comparison of Respondents and Nonrespondents

We abstracted the completed medical evaluation for every person eligible for the study; this included their medical history, laboratory results, and physical findings. Respondent (n = 9,508) and nonrespondent (n = 3,986) groups were similar in their percentages of women (53.7% and 51.0%, respectively) and in their mean years of education (14.0 years and 13.6 years, respectively). Respondents were older than nonrespondents (means 56.1 years and 49.3 years) and more likely to be white (83.9% vs. 75.3%) although the actual magnitude of the differences was small.

Respondents and nonrespondents did not differ with regard to their self-rated health, smoking, other substance abuse, or the presence of common medical conditions such as a history of heart attack or stroke, chronic obstructive lung disease, hypertension, or diabetes, or with regard to marital status or current family, marital, or job-related problems (data not shown). The health appraisal questionnaire used in the clinic contains a single question about childhood sexual abuse that reads "As a child were you ever raped or sexually molested?" Respondents were slightly more likely to answer affirmatively than nonrespondents (6.1% vs. 5.4%, respectively).

Questionnaire Design

We used questions from published surveys to construct the ACE Study questionnaire. Questions from the Conflicts Tactics Scale[39] were used to define psychological and physical abuse during childhood and to define violence against the respondent's mother. We adapted four questions from Wyatt[40] to define contact sexual abuse during childhood. Questions about exposure to alcohol or drug abuse during childhood were adapted from the 1988 National Health Interview Survey.[41] All of the questions we used in this study to determine childhood experiences were introduced with the phrase "While you were growing up during your first 18 years of life . . ."

Questions about health-related behaviors and health problems were taken from health surveys such as the Behavioral Risk Factor Surveys[42] and the Third National Health and Nutrition Examination Survey,[43] both of which are directed by the Centers for Disease Control and Prevention. Questions about depression came from the Diagnostic Interview Schedule of the National Institute of Mental Health (NIMH).[44] Other information for this analysis such as disease history was obtained from the standardized questionnaire used in the Health Appraisal Clinic. (A copy of the questionnaires used in this study may be found at *www.elsevier.com/locate/amepre.)*

Table 1. Prevalence of childhood exposure to abuse and household dysfunction

Category of childhood exposure[a]	Prevalence (%)	Prevalence (%)
Abuse by category		
Psychological		**11.1**
(Did a parent or other adult in the household . . .)		
Often or very often swear at, insult, or put you down?	10.0	
Often or very often act in a way that made you afraid that you would be physically hurt?	4.8	
Physical		**10.8**
(Did a parent or other adult in the household . . .)		
Often or very often push, grab, shove, or slap you?	4.9	
Often or very often hit you so hard that you had marks or were injured?	9.6	
Sexual		**22.0**
(Did an adult or person at least 5 years older ever . . .)		
Touch or fondle you in a sexual way?	19.3	
Have you touch their body in a sexual way?	8.7	
Attempt oral, anal, or vaginal intercourse with you?	8.9	
Actually have oral, anal, or vaginal intercourse with you?	6.9	
Household dysfunction by category		
Substance abuse		**25.6**
Live with anyone who was a problem drinker or alcoholic?	23.5	
Live with anyone who used street drugs?	4.9	
Mental illness		**18.8**
Was a household member depressed or mentally ill?	17.5	
Did a household member attempt suicide?	4.0	
Mother treated violently		**12.5**
Was your mother (or stepmother)		
Sometimes, often, or very often pushed, grabbed, slapped, or had something thrown at her?	11.9	
Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard?	6.3	
Ever repeatedly hit over at least a few minutes?	6.6	
Ever threatened with, or hurt by, a knife or gun?	3.0	
Criminal behavior in household		
Did a household member go to prison?	3.4	**3.4**
	Any category reported	**52.1%**

[a]An exposure to one or more items listed under the set of questions for each category.

Defining Childhood Exposures

We used three categories of childhood abuse: psychological abuse (2 questions), physical abuse (2 questions), or contact sexual abuse (4 questions). There were four categories of exposure to household dysfunction during childhood: exposure to substance abuse (defined by 2 questions), mental illness (2 questions), violent treatment of mother or stepmother (4 questions), and criminal behavior (1 question) in the household. Respondents were defined as exposed to a category if they responded "yes" to 1 or more of the questions in that category. The prevalence of positive responses to the individual questions and the category prevalences are shown in Table 1.

We used these 7 categories of childhood exposures to abuse and household dysfunction for our analysis. The measure of childhood exposure that we used was simply the sum of the categories with an exposure; thus the possible number of exposures ranged from 0 (unexposed) to 7 (exposed to all categories).

Risk Factors and Disease Conditions Assessed

Using information from both the study questionnaire and the Health Appraisal Clinic's questionnaire, we chose 10 risk factors that contribute to the leading causes of morbidity and mortality in the United States.[6,7,36,37] The risk factors included smoking, severe obesity, physical inactivity, depressed mood, suicide attempts, alcoholism, any drug abuse, parenteral drug abuse, a high lifetime number of sexual partners ($\geq$50), and a history of having a sexually transmitted disease.

We also assessed the relationship between childhood exposures and disease conditions that are among the leading causes of mortality in the United States.[6] The presence of these disease conditions was based upon medical histories that patients provided in response to the clinic questionnaire. We included a history of ischemic heart disease (including heart attack or use of nitroglycerin for exertional chest pain), any cancer, stroke, chronic bronchitis, or emphysema (COPD),

diabetes, hepatitis or jaundice, and any skeletal fractures (as a proxy for risk of unintentional injuries). We also included responses to the following question about self-rated health: "Do you consider your physical health to be excellent, very good, good, fair, or poor?" because it is strongly predictive of mortality.[45]

Definition of Risk Factors

We defined severe obesity as a body mass index (kg/meter^2) ≥35 based on measured height and weight; physical inactivity as no participation in recreational physical activity in the past month; and alcoholism as a "Yes" response to the question "Have you ever considered yourself to be an alcoholic?" The other risk factors that we assessed are self-explanatory.

Exclusions from Analysis

Of the 9,508 survey respondents, we excluded 51 (0.5%) whose race was unstated and 34 (0.4%) whose educational attainment was not reported. We also excluded persons who did not respond to certain questions about adverse childhood experiences. This involved the following exclusions: 125 (1.3%) for household substance abuse, 181 (1.9%) for mental illness in the home, 148 (1.6%) for violence against mother, 7 (0.1%) for imprisonment of a household member, 109 (1.1%) for childhood psychological abuse, 44 (0.5%) for childhood physical abuse, and 753 (7.9%) for childhood sexual abuse. After these exclusions, 8,056 of the original 9,508 survey respondents (59.7% of the original sample of 13,494) remained and were included in the analysis. Procedures for insuring that the findings based on complete data were generalizable to the entire sample are described below.

The mean age of the 8,506 persons included in this analysis was 56.1 years (range: 19–92 years); 52.1% were women; 79.4% were white. Forty-three percent had graduated from college; only 6.0% had not graduated from high school.

Statistical Analysis

We used the Statistical Analysis System (SAS)[46] for our analyses. We used the direct method to age-adjust the prevalence estimates. Logistic regression analysis was employed to adjust for the potential confounding effects of age, sex, race, and educational attainment on the relationship between the number of childhood exposures and health problems.

To test for a dose-response relationship to health problems, we entered the number of childhood exposures as a single ordinal variable (0, 1, 2, 3, 4, 5, 6, 7) into a separate logistic regression model for each risk factor or disease condition.

Assessing the Possible Influence of Exclusions

To determine whether our results were influenced by excluding persons with incomplete information on any of the categories of childhood exposure, we performed a separate sensitivity analysis in which we included all persons with complete demographic information but assumed that persons with missing information for a category of childhood exposure did not have an exposure in that category.

Results

Adverse Childhood Exposures

The level of positive responses for the 17 questions included in the seven categories of childhood exposure ranged from 3.0% for a respondent's mother (or stepmother) having been threatened with or hurt by a gun or knife to 23.5% for having lived with a problem drinker or alcoholic (Table 1). The most prevalent of the 7 categories of childhood exposure was substance abuse in the household (25.6%); the least prevalent exposure category was evidence of criminal behavior in the household (3.4%). More than half of respondents (52%) experienced ≥1 category of adverse childhood exposure; 6.2% reported ≥4 exposures.

Relationships between Categories of Childhood Exposure

The probability that persons who were exposed to any single category of exposure were also exposed to another category is shown in Table 2. The relationship between single categories of exposure was significant for all comparisons ($P < .001$; chi-square). For persons reporting any single category of exposure, the probability of exposure to any additional category ranged from 65%–93% (median: 80%); similarly, the probability of ≥2 additional exposures ranged from 40%–74% (median: 54.5%).

The number of categories of childhood exposures by demographic characteristics is shown in Table 3. Statistically, significantly fewer categories of exposure were found among older persons, white or Asian persons, and college graduates ($P < .001$). Because age is associated with both the childhood exposures as well as many of the health risk factors and disease outcomes, all prevalence estimates in the tables are adjusted for age.

Relationship between Childhood Exposures and Health Risk Factors

Both the prevalence and risk (adjusted odds ratio) increased for smoking, severe obesity, physical inactivity, depressed mood, and suicide attempts as the number of childhood exposures increased (Table 4). When

Table 2. Relationships between categories of adverse childhood exposure

First Category of Childhood Exposure	Sample Size*	Percent (%) Exposed to Another Category								
		Psychological Abuse	Physical Abuse	Sexual Abuse	Substance Abuse	Mental Illness	Treated Violently	Imprisoned Member	Any One Additional Category	Any Two Additional Categories
Childhood Abuse:										
Psychological	898	—	52*	47	51	50	39	9	93	74
Physical abuse	874	54	—	44	45	38	35	9	86	64
Sexual abuse	1770	24	22	—	39	31	23	6	65	41
Household dysfunction:										
Substance abuse	2064	22	19	34	—	34	29	8	69	40
Mental illness	1512	30	22	37	46	—	26	7	74	47
Mother treated violently	1010	34	31	41	59	38	—	10	86	62
Member imprisoned	271	29	29	40	62	42	37	—	86	64
	median	29.5	25.4	40.5	48.5	38	32	8.5	80	54.5
	range	(22–54)	(19–52)	(34–47)	(39–62)	(31–50)	(23–39)	(6–10)	(65–93)	(40–74)

*Number exposed to first category. For example, among persons who were psychologically abused, 52% were also physically abused. More persons were a second category than would be expected by chance ($P < .001$; chi-square).

persons with 4 categories of exposure were compared to those with none, the odds ratios ranged from 1.3 for physical inactivity to 12.2 for suicide attempts (Table 4).

Similarly, the prevalence and risk (adjusted odds ratio) of alcoholism, use of illicit drugs, injection of illicit drugs, ≥50 intercourse partners, and history of a sexually transmitted disease increased as the number of childhood exposures increased (Table 5). In comparing persons with ≥4 childhood exposures to those with none, odds ratios ranged from 2.5 for sexually transmitted diseases to 7.4 for alcoholism and 10.3 for injected drug use.

Childhood Exposures and Clustering of Health Risk Factors

We found a strong relationship between the number of childhood exposures and the number of health risk factors for leading causes of death in adults (Table 6). For example, among persons with no childhood exposures, 56% had none of the 10 risk factors whereas only 14% of persons with ≥4 categories of childhood exposure had no risk factors. By contrast, only 1% of persons with no childhood exposures had four or more risk factors, whereas 7% of persons with ≥4 childhood exposures had four or more risk factors (Table 6).

Relationship between Childhood Exposures and Disease Conditions

When persons with 4 or more categories of childhood exposure were compared to those with none, the odds ratios for the presence of studied disease conditions ranged from 1.6 for diabetes to 3.9 for chronic bronchitis or emphysema (Table 7). Similarly, the odds ratios for skeletal fractures, hepatitis or jaundice, and poor self-rated health were 1.6, 2.3, and 2.2, respectively (Table 8).

Significance of Dose-Response Relationships

In logistic regression models (which included age, gender, race, and educational attainment as covariates) we found a strong, dose-response relationship between the number of childhood exposures and each of the 10 risk factors for the leading causes of death that we studied ($P < .001$). We also found a significant ($P < .05$) dose-response relationship between the number of childhood exposures and the following disease conditions: ischemic heart disease, cancer, chronic bronchitis or emphysema, history of hepatitis or jaundice, skeletal fractures, and poor self-rated health. There was no statistically significant dose-response relationship for a history of stroke or diabetes.

Table 3. Prevalence of categories of adverse childhood exposures by demographic characteristics

Characteristic	Sample size (*N*)	Number of categories (%)[a]				
		0	1	2	3	4
Age group (years)						
19–34	807	35.4	25.4	17.2	11.0	10.9
35–49	2,063	39.3	25.1	15.6	9.1	10.9
50–64	2,577	46.5	25.2	13.9	7.9	6.6
≥65	2,610	60.0	24.5	8.9	4.2	2.4
Gender[b]						
Women	4,197	45.4	24.0	13.4	8.7	8.5
Men	3,859	53.7	25.8	11.6	5.0	3.9
Race[b]						
White	6,432	49.7	25.3	12.4	6.7	6.0
Black	385	38.8	25.7	16.3	12.3	7.0
Hispanic	431	42.9	24.9	13.7	7.4	11.2
Asian	508	66.0	19.0	9.9	3.4	1.7
Other	300	41.0	23.5	13.9	9.5	12.1
Education[b]						
No HS diploma	480	56.5	21.5	8.4	6.5	7.2
HS graduate	1,536	51.6	24.5	11.3	7.4	5.2
Any college	2,541	44.1	25.5	14.8	7.8	7.8
College graduate	3,499	51.4	25.1	12.1	6.1	5.3
All participants	**8,056**	**49.5**	**24.9**	**12.5**	**6.9**	**6.2**

[a]The number of categories of exposure was simply the sum of each of the seven individual categories that were assessed (see Table 1).
[b]Prevalence estimates adjusted for age.

Assessment of the Influence of Exclusions

In the sensitivity analysis where missing information for a category of childhood exposure was considered as no exposure, the direction and strength of the associations between the number of childhood exposures and the risk factors and disease conditions were nearly identical (data not shown). Thus, the results we present appear to be unaffected by our decision to exclude persons for whom information on any category of childhood exposure was incomplete.

Discussion

We found a strong dose response relationship between the breadth of exposure to abuse or household dysfunction during childhood and multiple risk factors for several of the leading causes of death in adults. Disease conditions including ischemic heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease, as well as poor self-rated health also showed a graded relationship to the breadth of childhood exposures. The findings suggest that the impact of these adverse childhood experiences on adult health status is strong and cumulative.

The clear majority of patients in our study who were exposed to one category of childhood abuse or household dysfunction were also exposed to at least one other. Therefore, researchers trying to understand the long-term health implications of childhood abuse may benefit from considering a wide range of related adverse childhood exposures. Certain adult health outcomes may be more strongly related to unique combinations or the intensity of adverse childhood exposures than to the total breadth of exposure that we used for our analysis. However, the analysis we present illustrates the need for an overview of the net effects of a *group* of complex interactions on a wide range of health risk behaviors and diseases.

Several potential limitations need to be considered when interpreting the results of this study. The data about adverse childhood experiences are based on self-report, retrospective, and can only demonstrate associations between childhood exposures and health risk behaviors, health status, and diseases in adulthood. Second, some persons with health risk behaviors or diseases may have been either more, or less, likely to report adverse childhood experiences. Each of these issues potentially limits inferences about causality. Furthermore, disease conditions could be either over- or under-reported by patients when they complete the medical questionnaire. In addition, there may be mediators of the relationship between childhood experiences and adult health status other than the risk factors we examined. For example, adverse childhood experiences may affect attitudes and behaviors toward health and health care, sensitivity to internal sensations, or physiologic functioning in brain centers and neurotransmitter systems. A more complete understanding of these issues is likely to lead to more effective ways to address the long-term health problems associated with childhood abuse and household dysfunction.

However, our estimates of the prevalence of child-

Table 4. Number of categories of adverse childhood exposure and the adjusted odds of risk factors including current smoking, severe obesity, physical inactivity, depressed mood, and suicide attempt

Health problem	Number of categories	Sample size (N)[a]	Prevalence (%)[b]	Adjusted odds ratio[c]	95% confidence interval
Current smoker[d]	0	3,836	6.8	1.0	Referent
	1	2,005	7.9	1.1	(0.9–1.4)
	2	1,046	10.3	1.5	(1.1–1.8)
	3	587	13.9	2.0	(1.5–2.6)
	4 or more	544	16.5	2.2	(1.7–2.9)
	Total	8,018	8.6	—	—
Severe obesity[d] (BMI ≥ 35)	0	3,850	5.4	1.0	Referent
	1	2,004	7.0	1.1	(0.9–1.4)
	2	1,041	9.5	1.4	(1.1–1.9)
	3	590	10.3	1.4	(1.0–1.9)
	4 or more	543	12.0	1.6	(1.2–2.1)
	Total	8,028	7.1	—	—
No leisure-time physical activity	0	3,634	18.4	1.0	Referent
	1	1,917	22.8	1.2	(1.1–1.4)
	2	1,006	22.0	1.2	(1.0–1.4)
	3	559	26.6	1.4	(1.1–1.7)
	4 or more	523	26.6	1.3	(1.1–1.6)
	Total	7,639	21.0	—	—
Two or more weeks of depressed mood in the past year	0	3,799	14.2	1.0	Referent
	1	1,984	21.4	1.5	(1.3–1.7)
	2	1,036	31.5	2.4	(2.0–2.8)
	3	584	36.2	2.6	(2.1–3.2)
	4 or more	542	50.7	4.6	(3.8–5.6)
	Total	7,945	22.0	—	—
Ever attempted suicide	0	3,852	1.2	1.0	Referent
	1	1,997	2.4	1.8	(1.2–2.6)
	2	1,048	4.3	3.0	(2.0–4.6)
	3	587	9.5	6.6	(4.5–9.8)
	4 or more	544	18.3	12.2	(8.5–17.5)
	Total	8,028	3.5	—	—

[a]Sample sizes will vary due to incomplete or missing information about health problems.
[b]Prevalence estimates are adjusted for age.
[c]Odds ratios adjusted for age, gender, race, and educational attainment.
[d]Indicates information recorded in the patient's chart before the study questionnaire was mailed.

hood exposures are similar to estimates from nationally representative surveys, indicating that the experiences of our study participants are comparable to the larger population of U.S. adults. In our study, 23.5% of participants reported having grown up with an alcohol abuser; the 1988 National Health Interview Survey estimated that 18.1% of adults had lived with an alcohol abuser during childhood.[41] Contact sexual abuse was reported by 22% of respondents (28% of women and 16% of men) in our study. A national telephone survey of adults in 1990 using similar criteria for sexual abuse estimated that 27% of women and 16% of men had been sexually abused.[12]

There are several reasons to believe that our estimates of the long-term relationship between adverse childhood experiences and adult health are conservative. Longitudinal follow-up of adults whose childhood abuse was well documented has shown that their retrospective reports of childhood abuse are likely to underestimate actual occurrence.[47,48] Underestimates of childhood exposures would result in downwardly biased estimates of the relationships between childhood exposures and adult health risk behaviors and diseases. Another potential source of underestimation of the strength of these relationships is the lower number of childhood exposures reported by older persons in our study. This may be an artifact caused by premature mortality in persons with multiple adverse childhood exposures; the clustering of multiple risk factors among persons with multiple childhood exposures is consistent with this hypothesis. Thus, the true relationships between adverse childhood exposures and adult health risk behaviors, health status, and diseases may be even stronger than those we report.

An essential question posed by our observations is, "Exactly how are adverse childhood experiences linked to health risk behaviors and adult diseases?" The link-

Table 5. Number of categories of adverse childhood exposure and the prevalence and risk (adjusted odds ratio) of health risk factors including alcohol or drug abuse, high lifetime number of sexual partners, or history of sexually transmitted disease

Health problem	Number of categories	Sample size (N)[a]	Prevalence (%)[b]	Adjusted odds ratio[c]	95% confidence interval
Considers self an alcoholic	0	3,841	2.9	1.0	Referent
	1	1,993	5.7	2.0	(1.6–2.7)
	2	1,042	10.3	4.0	(3.0–5.3)
	3	586	11.3	4.9	(3.5–6.8)
	4 or more	540	16.1	7.4	(5.4–10.2)
	Total	8,002	5.9	—	—
Ever used illicit drugs	0	3,856	6.4	1.0	Referent
	1	1,998	11.4	1.7	(1.4–2.0)
	2	1,045	19.2	2.9	(2.4–3.6)
	3	589	21.5	3.6	(2.8–4.6)
	4 or more	541	28.4	4.7	(3.7–6.0)
	Total	8,029	11.6	—	—
Ever injected drugs	0	3,855	0.3	1.0	Referent
	1	1,996	0.5	1.3	(0.6–3.1)
	2	1,044	1.4	3.8	(1.8–8.2)
	3	587	2.3	7.1	(3.3–15.5)
	4 or more	540	3.4	10.3	(4.9–21.4)
	Total	8,022	0.8	—	—
Had 50 or more intercourse partners	0	3,400	3.0	1.0	Referent
	1	1,812	5.1	1.7	(1.3–2.3)
	2	926	6.1	2.3	(1.6–3.2)
	3	526	6.3	3.1	(2.0–4.7)
	4 or more	474	6.8	3.2	(2.1–5.1)
	Total	7,138	4.4	—	—
Ever had a sexually transmitted disease[d]	0	3,848	5.6	1.0	Referent
	1	2,001	8.6	1.4	(1.1–1.7)
	2	1,044	10.4	1.5	(1.2–1.9)
	3	588	13.1	1.9	(1.4–2.5)
	4 or more	542	16.7	2.5	(1.9–3.2)
	Total	8023	8.2	—	—

[a]Sample sizes will vary due to incomplete or missing information about health problems.
[b]Prevalence estimates are adjusted for age.
[c]Odds ratios adjusted for age, gender, race, and educational attainment.
[d]Indicates information recorded in the patient's chart before the study questionnaire was mailed.

ing mechanisms appear to center on behaviors such as smoking, alcohol or drug abuse, overeating, or sexual behaviors that may be consciously or unconsciously used because they have immediate pharmacological or psychological benefit as coping devices in the face of the stress of abuse, domestic violence, or other forms of family and household dysfunction. High levels of exposure to adverse childhood experiences would expectedly produce anxiety, anger, and depression in children. To the degree that behaviors such as smoking, alcohol, or drug use are found to be effective as coping devices, they would tend to be used chronically. For

Table 6. Relationship between number of categories of childhood exposure and number of risk factors for the leading causes of death[a]

Number of categories	Sample size	% with number of risk factors 0	1	2	3	4
0	3,861	56	29	10	4	1
1	2,009	42	33	16	6	2
2	1,051	31	33	20	10	4
3	590	24	33	20	13	7
≥4	545	14	26	28	17	7
Total	8,056	44	31	15	7	3

[a]Risk factors include: smoking, severe obesity, physical inactivity, depressed mood, suicide attempt, alcoholism, any drug use, injected drug use, ≥50 lifetime sexual partners, and history of a sexually transmitted disease.

Table 7. Number of categories of adverse childhood exposure and the prevalence and risk (adjusted odds ratio) of heart attack, cancer, stroke, COPD, and diabetes

Disease condition[d]	Number of categories	Sample size (N)[a]	Prevalence (%)[b]	Adjusted odds ratio[c]	95% confidence interval
Ischemic heart disease	0	3,859	3.7	1.0	Referent
	1	2,009	3.5	0.9	(0.7–1.3)
	2	1,050	3.4	0.9	(0.6–1.4)
	3	590	4.6	1.4	(0.8–2.4)
	4 or more	545	5.6	2.2	(1.3–3.7)
	Total	8,022	3.8	—	—
Any cancer	0	3,842	1.9	1.0	Referent
	1	1,995	1.9	1.2	(1.0–1.5)
	2	1,043	1.9	1.2	(1.0–1.5)
	3	588	1.9	1.0	(0.7–1.5)
	4 or more	543	1.9	1.9	(1.3–2.7)
	Total	8,011	1.9	—	—
Stroke	0	3,832	2.6	1.0	Referent
	1	1,993	2.4	0.9	(0.7–1.3)
	2	1,042	2.0	0.7	(0.4–1.3)
	3	588	2.9	1.3	(0.7–2.4)
	4 or more	543	4.1	2.4	(1.3–4.3)
	Total	7,998	2.6	—	—
Chronic bronchitis or emphysema	0	3,758	2.8	1.0	Referent
	1	1,939	4.4	1.6	(1.2–2.1)
	2	1,009	4.4	1.6	(1.1–2.3)
	3	565	5.7	2.2	(1.4–3.3)
	4 or more	512	8.7	3.9	(2.6–5.8)
	Total	7,783	4.0	—	—
Diabetes	0	3,850	4.3	1.0	Referent
	1	2,002	4.1	1.0	(0.7–1.3)
	2	1,046	3.9	0.9	(0.6–1.3)
	3	587	5.0	1.2	(0.8–1.9)
	4 or more	542	5.8	1.6	(1.0–2.5)
	Total	8,027	4.3	—	—

[a]Sample sizes will vary due to incomplete or missing information about health problems.
[b]Prevalence estimates are adjusted for age.
[c]Odds ratios adjusted for age, gender, race, and educational attainment.
[d]Indicates information recorded in the patient's chart before the study questionnaire was mailed.

example, nicotine is recognized as having beneficial psychoactive effects in terms of regulating affect[49] and persons who are depressed are more likely to smoke.[50,51] Thus, persons exposed to adverse childhood experiences may benefit from using drugs such as nicotine to regulate their mood.[49,52]

Consideration of the positive neuroregulatory effects of health-risk behaviors such as smoking may provide biobehavioral explanations[53] for the link between adverse childhood experiences and health risk behaviors and diseases in adults. In fact, we found that exposure to higher numbers of categories of adverse childhood experiences increased the likelihood of smoking by the age of 14, chronic smoking as adults, and the presence of smoking-related diseases. Thus, smoking, which is medically and socially viewed as a "problem" may, from the perspective of the user, represent an effective immediate solution that leads to chronic use. Decades later, when this "solution" manifests as emphysema, cardiovascular disease, or malignancy, time and the tendency to ignore psychological issues in the management of organic disease make improbable any full understanding of the original causes of adult disease (Figure 2). Thus, incomplete understanding of the possible benefits of health risk behaviors leads them to be viewed as irrational and having solely negative consequences.

Because adverse childhood experiences are common and they have strong long-term associations with adult health risk behaviors, health status, and diseases, increased attention to primary, secondary, and tertiary prevention strategies is needed. These strategies include prevention of the occurrence of adverse childhood experiences, preventing the adoption of health risk behaviors as responses to adverse experiences during childhood and adolescence, and, finally, helping change the health risk behaviors and ameliorating the disease burden among adults whose health problems may represent a long-term consequence of adverse childhood experiences.

Table 8. Number of categories of adverse childhood exposure and the prevalence and risk (adjusted odds ratio) of skeletal fracture, hepatitis or jaundice, and poor self-rated health

Disease condition	Number of categories	Sample size (N)[a]	Prevalence (%)[b]	Adjusted odds ratio[c]	95% confidence interval
Ever had a skeletal fracture	0	3,843	3.6	1.0	Referent
	1	1,998	4.0	1.1	(1.0–1.2)
	2	1,048	4.5	1.4	(1.2–1.6)
	3	587	4.0	1.2	(1.0–1.4)
	4 or more	544	4.8	1.6	(1.3–2.0)
	Total	8,020	3.9	—	—
Ever had hepatitis or jaundice	0	3,846	5.3	1.0	Referent
	1	2,006	5.5	1.1	(0.9–1.4)
	2	1,045	7.7	1.8	(1.4–2.3)
	3	590	10.2	1.6	(1.2–2.3)
	4 or more	543	10.7	2.4	(1.8–3.3)
	Total	8,030	6.5	—	—
Fair or poor self-rated health	0	3,762	16.3	1.0	Referent
	1	1,957	17.8	1.2	(1.0–1.4)
	2	1,029	19.9	1.4	(1.2–1.7)
	3	584	20.3	1.4	(1.1–1.7)
	4 or more	527	28.7	2.2	(1.8–2.7)
	Total	7,859	18.2	—	—

[a]Sample sizes will vary due to incomplete or missing information about health problems.
[b]Prevalence estimates are adjusted for age and gender.
[c]Odds ratios adjusted for age, gender, race, and educational attainment.
[d]Indicates information recorded in the patient's chart before the study questionnaire was mailed.

Primary prevention of adverse childhood experiences has proven difficult[54,55] and will ultimately require societal changes that improve the quality of family and household environments during childhood. Recent research on the long-term benefit of early home visitation on reducing the prevalence of adverse childhood experiences is promising.[56] In fact, preliminary data from the ACE Study provided the impetus for the Kaiser Health Plan to provide funding to participate at 4 locations (including San Diego County, California) in the Commonwealth Fund's "Healthy Steps" program. This program extends the traditional practice of pediatrics by adding one or more specialists in the developmental and psychosocial dimensions of both childhood and parenthood. Through a series of office visits, home visits, and a telephone advice line for parents, these specialists develop close relationships between children and their families from birth to 3 years of age. This approach is consistent with the recommendation of the U.S. Advisory Board on Child Abuse and Neglect that a universal home visitation program for new parents be developed[57,58] and provides an example of a family-based primary prevention effort that is being explored in a managed care setting. If these types of approaches can be replicated and implemented on a large scale, the long-term benefits may include, somewhat unexpectedly, substantial improvements in overall adult health.

Secondary prevention of the effects of adverse childhood experiences will first require increased recognition of their occurrence and second, an effective understanding of the behavioral coping devices that commonly are adopted to reduce the emotional impact of these experiences. The improbability of giving up an immediate "solution" in return for a nebulous long-term health benefit has thwarted many well-intended preventive efforts. Although articles in the general medical literature are alerting the medical community to the fact that childhood abuse is common,[59] adolescent health care is often inadequate in terms of psychosocial assessment and anticipatory guidance.[60] Clearly, comprehensive strategies are needed to identify and intervene with children and families who are at risk for these adverse experiences and their related outcomes.[61] Such strategies should include increased communication between and among those involved in family practice, internal medicine, nursing, social work, pediatrics, emergency medicine, and preventive medicine and public health. Improved understanding is also needed of the effects of childhood exposure to domestic violence.[19,62] Additionally, increased physician training[63] is needed to recognize and coordinate the management of all persons affected by child abuse, domestic violence, and other forms of family adversity such as alcohol abuse or mental illness.

In the meantime, tertiary care of adults whose health problems are related to experiences such as childhood abuse[5] will continue to be a difficult challenge. The relationship between childhood experiences and adult health status is likely to be overlooked in medical practice because the time delay between exposure

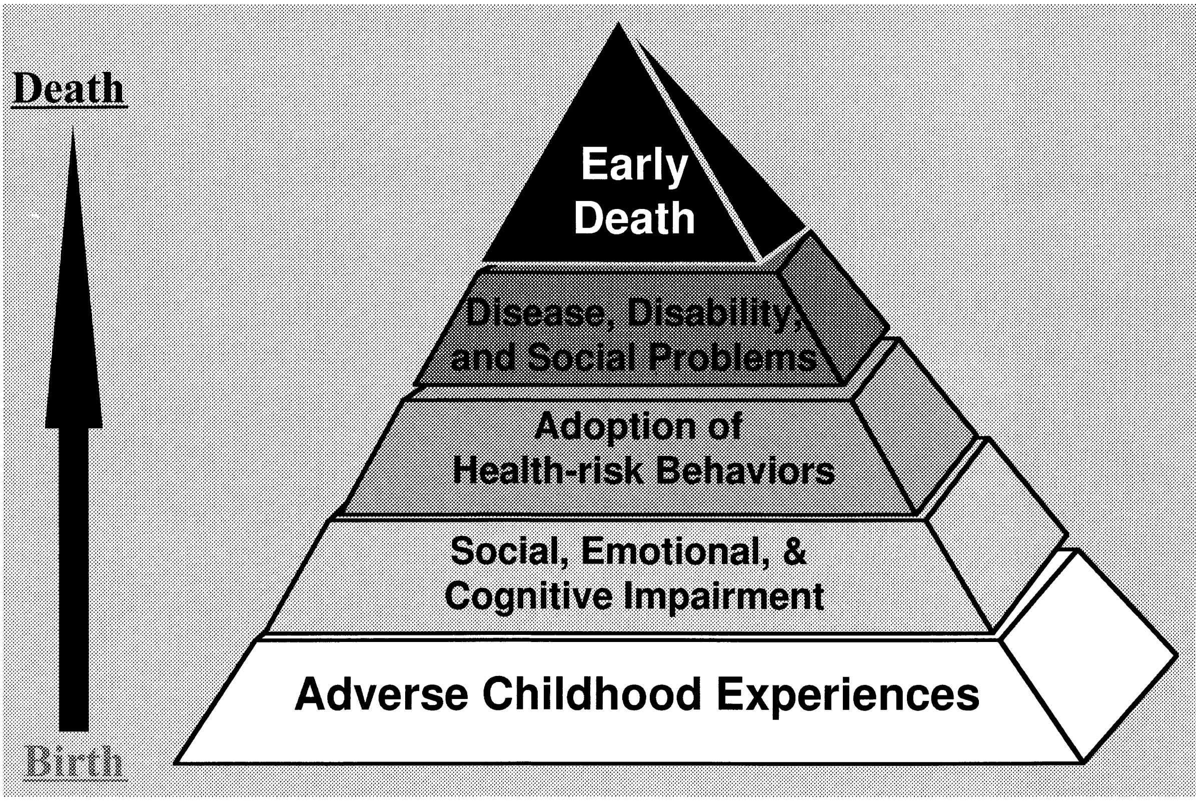


Figure 2. Potential influences throughout the lifespan of adverse childhood experiences.

during childhood and recognition of health problems in adult medical practice is lengthy. Moreover, these childhood exposures include emotionally sensitive topics such as family alcoholism[29,30] and sexual abuse.[64] Many physicians may fear that discussions of sexual violence and other sensitive issues are too personal even for the doctor-patient relationship.[65] For example, the American Medical Association recommends screening of women for exposure to violence at every entrance to the health system;[66] however, such screening appears to be rare.[67] By contrast, women who are asked about exposure to sexual violence say they consider such questions to be welcome and germane to routine medical care,[68] which suggests that physicians' fears about patient reactions are largely unfounded.

Clearly, further research and training are needed to help medical and public health practitioners understand how social, emotional, and medical problems are linked throughout the lifespan (Figure 2). Such research and training would provide physicians with the confidence and skills to inquire and respond to patients who acknowledge these types of childhood exposures. Increased awareness of the frequency and long-term consequences of adverse childhood experiences may also lead to improvements in health promotion and disease prevention programs. The magnitude of the difficulty of introducing the requisite changes into medical and public health research, education, and practice can be offset only by the magnitude of the implications that these changes have for improving the health of the nation.

We thank Naomi Howard for her dedication to the ACE Study. This research is supported by the Centers for Disease Control and Prevention via cooperative agreement TS-44-10/12 with the Association of Teachers of Preventive Medicine.

References

1. Springs F, Friedrich WN. Health risk behaviors and medical sequelae of childhood sexual abuse. Mayo Clin Proc 1992;67:527–32.
2. Felitti VJ. Long-term medical consequences of incest, rape, and molestation. South Med J 1991;84:328–31.
3. Felitti VJ. Childhood sexual abuse, depression and family dysfunction in adult obese patients: a case control study. South Med J 1993;86:732–6.
4. Gould DA, Stevens NG, Ward NG, Carlin AS, Sowell HE, Gustafson B. Self-reported childhood abuse in an adult population in a primary care setting. Arch Fam Med 1994;3:252–6.
5. McCauley J, Kern DE, Kolodner K, Schroeder AF, et al. Clinical characteristics of women with a history of childhood abuse. JAMA 1997;277:1362–8.

6. Mortality patterns: United States, 1993. Morb Mortal Wkly Rep 1996;45:161–4.
7. McGinnis JM, Foege WH. Actual causes of death in the United States. JAMA 1993;270:2207–12.
8. Landis J. Experiences of 500 children with adult sexual deviation. Psychiatr Q 1956;30(Suppl):91–109.
9. Straus MA, Gelles RJ. Societal change and change in family violence from 1975 to 1985 as revealed by two national surveys. J Marriage Family 1986;48:465–79.
10. Wyatt GE, Peters SD. Methodological considerations in research on the prevalence of child sexual abuse. Child Abuse Negl 1986;10:241–51.
11. Berger AM, Knutson JF, Mehm JG, Perkins KA. The self-report of punitive childhood experiences of young adults and adolescents. Child Abuse Negl 1988;12:251–62.
12. Finkelhor D, Hotaling G, Lewis IA, Smith C. Sexual abuse in a national survey of adult men and women: prevalence, characteristics, and risk factors. Child Abuse Negl 1990; 14:19–28.
13. Egelend B, Sroufe LA, Erickson M. The developmental consequence of different patterns of maltreatment. Child Abuse Negl 1983;7:459–69.
14. Finkelhor D, Browne A. The traumatic impact of child sexual abuse Am J Orthopsychiatry. 1985;55:530–41.
15. Beitchman JH, Zucker KJ, Hood JE, DaCosta GA, Akman D, Cassavia E. A review of the long-term effects of sexual abuse. Child Abuse Negl 1992;16:101–18.
16. Hibbard RA, Ingersoll GM, Orr DP. Behavioral risk, emotional risk, and child abuse among adolescents in a nonclinical setting. Pediatrics 1990;86:896–901.
17. Nagy S, Adcock AG, Nagy MC. A comparison of risky health behaviors of sexually active, sexually abused, and abstaining adolescents. Pediatrics 1994;93:570–5.
18. Cunningham RM, Stiffman AR, Dore P. The association of physical and sexual abuse with HIV risk behaviors in adolescence and young adulthood: implications for public health. Child Abuse Negl 1994;18:233–45.
19. Council on Scientific Affairs. Adolescents as victims of family violence. JAMA 1993;270:1850–6.
20. Nelson DE, Higginson GK, Grant-Worley JA. Physical abuse among high school students. Prevalence and correlation with other health behaviors. Arch Pediatr Adolesc Med 1995;149:1254–8.
21. Mullen PE, Roman-Clarkson SE, Walton VA, Herbison GP. Impact of sexual and physical abuse on women's mental health. Lancet 1988;1:841–5.
22. Drossman DA, Leserman J, Nachman G, Li Z, et al. Sexual and physical abuse in women with functional or organic gastrointestinal disorders. Ann Intern Med 1990;113: 828–33.
23. Harrop-Griffiths J, Katon W, Walker E, Holm L, Russo J, Hickok L. The association between chronic pelvic pain, psychiatric diagnoses, and childhood sexual abuse. Obstet Gynecol 1988;71:589–94.
24. Briere J, Runtz M. Multivariate correlates of childhood psychological and physical maltreatment among university women. Child Abuse Negl 1988;12:331–41.
25. Briere J, Runtz M. Differential adult symptomatology associated with three types of child abuse histories. Child Abuse Negl 1990;14:357–64.
26. Claussen AH, Crittenden PM. Physical and psychological maltreatment: relations among types of maltreatment. Child Abuse Negl 1991;15:5–18.
27. Moeller TP, Bachman GA, Moeller JR. The combined effects of physical, sexual, and emotional abuse during childhood: long-term health consequences for women. Child Abuse Negl 1993;17:623–40.
28. Bryant SL, Range LM. Suicidality in college women who were sexually and physically punished by parents. Violence Vict 1995;10:195–201.
29. Zeitlen H. Children with alcohol misusing parents. Br Med Bull 1994;50:139–51.
30. Dore MM, Doris JM, Wright P. Identifying substance abuse in maltreating families: a child welfare challenge. Child Abuse Negl 1995;19:531–43.
31. Ethier LS, Lacharite C, Couture G. Childhood adversity, parental stress, and depression of negligent mothers. Child Abuse Negl 1995;19:619–32.
32. Spaccarelli S, Coatsworth JD, Bowden BS. Exposure to family violence among incarcerated boys; its association with violent offending and potential mediating variables. Violence Vict 1995;10:163–82.
33. McCloskey LA, Figueredo AJ, Koss MP. The effects of systemic family violence on children's mental health. Child Dev 1995;66:1239–61.
34. Brent DA, Perper JA, Moritz G, Schweers J, Balach L, Roth C. Familial risk factors for adolescent suicide: a case-control study. Acta Psychiatr Scand 1994;89:52–8.
35. Shaw DS, Vondra JI, Hommerding KD, Keenan K, Dunn M. Chronic family adversity and early child behavior problems: a longitudinal study of low income families. J Child Psychol Psychiatry 1994;35:1109–22.
36. U.S. Department of Health and Human Services. Physical activity and health: A report of the Surgeon General. Atlanta, Georgia. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.
37. Rivara FP, Mueller BA, Somes G, Mendoza CT, Rushforth NB, Kellerman AL. Alcohol and illicit drug abuse and the risk of violent death in the home. JAMA 1997;278:569–75.
38. Dillman DA. Mail and telephone surveys: the total design method. New York: John Wiley & Sons; 1978.
39. Straus M, Gelles RJ. Physical violence in American families: risk factors and adaptations to violence in 8,145 families. New Brunswick: Transaction Press; 1990.
40. Wyatt GE. The sexual abuse of Afro-American and White-American women in childhood. Child Abuse Negl 1985; 9:507–19.
41. National Center for Health Statistics. Exposure to alcoholism in the family: United States, 1988. Advance Data, No. 205. U.S. Department of Health and Human Services, Washington, DC; September 30, 1991.
42. Siegel PZ, Frazier EL, Mariolis P, et al. Behaviorial risk factor surveillance, 1991; Monitoring progress toward the Nation's Year 2000 Health Objectives. Morb Mortal Wkly Rep 1992;42(SS-4).1–15.
43. Crespo CJ, Keteyian SJ, Heath GW, Sempos CT. Leisure-time physical activity among US adults: Results from the

Third National Health and Nutrition Examination Survey. Arch Intern Med 1996;156:93–8.
44. Robins LN, Helzer JE, Groughan J, Ratliff K. National Institute of Mental Health Diagnostic Interview Schedule: its history, characteristics, and validity. Arch Gen Psychiatry 1981;38:381–9.
45. Idler E, Angel RJ. Self-rated health and mortality in the NHANES I Epidemiologic Follow-up Study. Am J Pub Health 1990;80:446–52.
46. SAS Procedures Guide. SAS Institute Inc. Version 6, 3rd edition, Cary, NC: SAS Institute; 1990.
47. Femina DD, Yeager CA, Lewis DO. Child abuse: adolescent records vs. adult recall. Child Abuse Negl 1990;14: 227–31.
48. Williams LM. Recovered memories of abuse in women with documented child sexual victimization histories. J Traumatic Stress 1995;8:649–73.
49. Carmody TP. Affect regulation, nicotine addiction, and smoking cessation. J Psychoactive Drugs 1989;21:331–42.
50. Anda RF, Williamson DF, Escobedo LG, Mast EE, Giovino GA, Remington PL. Depression and the dynamics of smoking. A national perspective. JAMA 1990;264:1541–5.
51. Glassman AH, Helzer JE, Covey LS, Cottler LB, Stetner F, Tipp JE, Johnson J. Smoking, smoking cessation, and major depression. JAMA 1990;264:1546–9.
52. Hughes JR. Clonidine, depression, and smoking cessation. JAMA 1988;259:2901–2.
53. Pomerlau OF, Pomerlau CS. Neuroregulators and the reinforcement of smoking: towards a biobehavioral explanation. Neurosci Biobehav Rev 1984;8:503–13.
54. Hardy JB, Street R. Family support and parenting education in the home: an effective extension of clinic-based preventive health care services for poor children. J Pediatr 1989;115:927–31.
55. Olds DL, Henderson CR, Chamberlin R, Tatelbaum R. Preventing child abuse and neglect: a randomized trial of nurse home visitation. Pediatrics 1986;78:65–78.
56. Olds DL, Eckenrode J, Henderson CR, Kitzman H, et al. Long-term effects of home visitation on maternal life course and child abuse and neglect: Fifteen-year follow-up of a randomized trial. JAMA 1997;278:637–43.
57. U.S. Advisory Board on Child Abuse and Neglect. Child abuse and neglect: critical first steps in response to a national emergency. Washington, DC: U.S. Government Printing Office; August 1990; publication no. 017-092-00104-5.
58. U.S. Advisory Board on Child Abuse and Neglect. Creating caring communities: blueprint for an effective federal policy on child abuse and neglect. Washington, DC: U.S. Government Printing Office; September 1991.
59. MacMillan HL, Fleming JE, Trocme N, Boyle MH, et al. Prevalence of child physical and sexual abuse in the community. Results from the Ontario Health Supplement. JAMA 1997;278:131–5.
60. Rixey S. Family violence and the adolescent. Maryland Med J 1994;43:351–3.
61. Chamberlin RW. Preventing low birth weight, child abuse, and school failure: the need for comprehensive, community-wide approaches. Pediatr Rev 1992;13:64–71.
62. Kashani JH, Daniel AE, Dandoy AC, Holcomb WR. Family violence: impact on children. J Am Acad Child Adolesc Psychiatry 1992;31:181–9.
63. Dubowitz H. Child abuse programs and pediatric residency training. Pediatrics 1988;82:477–80.
64. Tabachnick J, Henry F, Denny L. Perceptions of child sexual abuse as a public health problem. Vermont, September 1995. Morb Mortal Wkly Rep 1997;46:801–3.
65. Sugg NK, Inui T. Primary care physicians' response to domestic violence. Opening Pandora's box. JAMA 1992; 267:3157–60.
66. Council on Scientific Affairs. American Medical Association Diagnostic and Treatment Guidelines on Domestic Violence. Arch Fam Med 1992;1:38–47.
67. Hamberger LK, Saunders DG, Hovey M. Prevalence of domestic violence in community practice and rate of physician inquiry. Fam Med 1992;24:283–7.
68. Friedman LS, Samet JH, Roberts MS, Hans P. Inquiry about victimization experiences. A survey of patient preferences and physician practices. Arch Int Med 1992;152: 1186–90.